

## Suggestions for a Physiological Classification of Depression

By JOHN D. POLLITT

Depression is the commonest of mental illnesses and fortunately it has a better outcome with treatment than any other psychiatric condition. It shows itself in a variety of guises, and as there is no universal formula for treating the different types, a classification is essential. During the past ten years the arrival of the tranquillizers and particularly antidepressants has revolutionized our view of depressive illness, yet we are still using terms which are purely descriptive, determined by administrative needs long forgotten, or loosely related to aetiology about which we still know little. The time has come to link the classification of depression with rational treatment, but before offering a scheme to do this, a brief consideration of the inadequacies of existing terminology may help to explain the need for a new scheme.

The word psychotic is usually associated with severity of illness and the need for urgent treatment, but it does not bear a close relation to the need for hospitalization. Endogenous, exogenous, reactive and neurotic depressions have been shown to overlap (Lewis, 1934; Garmany, 1958). Many illnesses with classical endogenous features have obvious psychological precipitants. The terms puerperal, involutional and senile merely link the illness with three of the seven ages of man. "Retarded" and "agitated" are only partial clinical descriptions, while "schizo-affective" can cover a depressed schizophrenic youth or a paranoid lady of eighty. Probably the most valuable, in the sense of giving us information about prognosis and the difficulties in treatment, is the word "recurrent", but so deficient is our present classification that we have no word to indicate the single solitary attack in which the patient presents with depression for the first time.

Perhaps the ideal classification will be based on defined changes in brain function, but although we cannot yet correlate brain function

with psychological events, we can at least separate reactions showing somatic symptoms based on disturbed physiology from those in which such changes are absent. A suitable keystone for a new classification would be the symptoms listed in Table I which include some of the classical symptoms in severe cases of so-called "endogenous depression".

TABLE I

*Symptoms of Depressive Illness with Physiological Basis*

Diurnal mood swing	Impotence
Early morning waking	Menstrual changes
Loss of weight	Diminished pulse rate
Constipation	Lowered blood pressure
Loss of appetite	Lowered body temperature
Inability to weep	Loss of facial flush
Dry mouth	Cold extremities
Decreased sex desire	

These symptoms are semi-permanent, they form a recognizable pattern and they respond to a number of physical treatments leaving no trace of disturbed physiology; in fact they are used to select patients likely to respond well to electroplexy. They indicate a pathological degree of depression regardless of its type, they may appear independently of psychological stress and their severity is not related to the degree of accompanying change in mood. These symptoms and other physiological changes in depression result from alterations in biological rhythms, metabolism and autonomic balance, and they are not seen collectively in any other illness. For these reasons, this group of symptoms has been labelled the "depressive functional shift" as a means of distinguishing it from purely dynamic or clinical concepts associated with depression (Pollitt, 1960). The place of the functional shift in terms of the physiology of the nervous system and the predisposing and precipitating

TABLE II  
Results of Investigation of Metabolism and Autonomic Function in Depression

Function	Author
Diminished secretion of gastric juice .. .. .	Farr and Lueders (1923)
Diminished secretion of saliva .. .. .	Strongin and Hinsie (1938); Peck (1959)
Diminished peristalsis of intestines .. .. .	Henry (1931)
Alteration of basic metabolic rate .. .. .	Hawley (1913); Reiss (1954)
Delayed water excretion .. .. .	Quoted by Mayer-Gross, Slater and Roth (1955)
Lag glucose tolerance curve .. .. .	
Disturbance of sodium, potassium and cholesterol metabolism }	

factors remains to be considered before a classification based on its clinical identification can be adopted.

#### THE FUNCTIONAL SHIFT IN DEPRESSION

The symptoms of the functional shift result from alterations in biological rhythms, metabolism and autonomic balance. Some investigations of metabolism and autonomic function in depressive illness are shown in Table II.

The group of functions disturbed in the functional shift is attributed to the hypothalamus, which is responsible for homeostasis (Gellhorn, 1957), the regulation of certain biological rhythms (such as sleep), metabolism, and the autonomic nervous system. The relationship between disturbed hypothalamic or diencephalic function and the symptoms and physiology of depression have been discussed by Zondek (1944), Partridge (1949), Mayer-Gross, Slater and Roth (1955), and Kraines (1957).

Table III shows functions attributed to the hypothalamus and disturbed in the depressive shift.

The emotional changes referred to cannot by themselves be fully identified with the concept of endogenous depression. Only if it were possible to correlate certain feelings with constant changes in body function would this be justified. There are certain differences, and therefore in the present discussion, emphasis is upon the most commonly appearing group of sustained physiological symptoms considered independently of age, recurrence, periodicity, admixture of symptoms or alleged precipitant of them. It seems likely that these symptoms are produced by a common mechanism in

TABLE III

#### Hypothalamic Function and Depression

Functions Regulated in Normal Life	Disturbance in Depression
Sleep	Specific disturbance of rhythm
Gastro-intestinal peristalsis	Diminished peristalsis
Heart rate	Heart rate diminished
Body temperature	Lowered body temperature
Weight	Loss of weight
Appetite	Loss of appetite
Metabolism	Disturbance of metabolism
Menstrual cycle	Modification of menstrual cycle
Sex	Impotence or frigidity

depression regardless of other features determining the phrase used for classification or psychodynamic formulation.

Although the feeling of emotion (affect) cannot be expressed in physiological terms, evidence from animal experiments (Bard, 1950) and from surgical procedures in man (Alpers, 1940) suggest that the mediation of emotional expression is also a function of the hypothalamus. In the light of Darwin's view (1873) that emotional expression is a response designed for self-defence, it is suggested that the hypothalamus is concerned not only with regulation of the internal environment (homeostasis) but plays an important part in adjustment of the individual to stressful life situations.

It is noticeable that in severe depression both homeostatic mechanisms, as shown by the physiological shift, and emotional defence mechanisms, such as the expression of anger,

are disturbed and all changes are in a negative direction.

#### FACTORS PREDISPOSING TO THE FUNCTIONAL SHIFT

The functional shift, as a whole, is not seen in man except in cases of depression of endogenous type and it is necessary to turn to the lower animals to study a similar phenomenon. The resemblance between the periodicity of manic-depressive illnesses and hibernation was reported by Lange (1928), and further study of the physiological changes in hibernation shows close resemblance to those forming the functional shift. Lowered metabolic rate (Lyman and Chatfield, 1955), weight loss (Benedict and Lee, 1938; Kayser, 1952a), hypothermia (Johnson, 1931; Kayser, 1952b), bradycardia (Hiebel and Kayser, 1950; Suomalainen and Sarajas, 1951), hypotension (Lyman and Chatfield, 1955) have been demonstrated; superficial observation confirms the retardation, diminished bodily activity and lowered sex drive. These changes in hibernation have been attributed to altered function of the hypothalamus. The periodicity of many manic-depressive illnesses suggests an intrinsic long-cycle rhythm similar in length to hibernation and much longer than better understood cycles such as menstruation. The lack of psychological precipitant for many recurrent depressions also suggests an intrinsic mechanism.

In man, a functional shift is commonly observed in depressive illness after mid-life. The work of Titley (1936), Lewis (1936), Abraham (1948) and Hamilton and Mann (1954) showed that depressions of the type usually associated with such functional changes develop frequently in persons of obsessive or anal-erotic character. Stainbrook (1954) emphasized that depression was more frequent in highly civilized cultures than in those less civilized, and there is also a greater frequency both in upper social classes (Hollingshead and Redlich, 1958), and in town dwellers (Malzberg, 1940).

The spontaneous appearance of depression with a functional shift is rare in children (Kasanin, 1931; Muncie, 1939; Mayer-Gross,

Slater and Roth, 1955), adolescents (Muncie, 1939), psychopaths (Hamilton and White, 1959), and hysterical personalities. The broad difference is that people who develop a functional shift have the capacity to inhibit the expression of emotion whereas those that do not develop it are facile in emotional ease. The factors predisposing to development of the functional shift such as increasing age, obsessional character, civilization, urban dwelling and upper socio-economic position are all associated with developed powers of involuntary control of expression when experiencing emotion, whereas free emotional display is commonly expected of a child, admired in the hysteric, and deplored in the psychopath.

#### PRECIPITATION OF THE FUNCTIONAL SHIFT

It is well known that identical clinical pictures of "endogenous" depression may be precipitated by purely psychological stresses such as bereavement or by physical stresses such as influenza or brain lesions. Many atypical pictures respond as well as classical ones to antidepressants and E.C.T.

It is suggested that, in cases of purely psychological precipitation, the full functional shift develops only in predisposed individuals who are both sensitive to situations calling forth emotion and capable of involuntarily controlling the expression of such emotion. Predisposed individuals, when facing situations requiring greater than average emotional control, suppress involuntarily not only the hypothalamic function concerned with emotional mediation, but also many other hypothalamic functions such as the regulation of appetite and sleep, so producing clinically the functional shift. Although the emotion of anger is commonly cited as that which is suppressed in the dynamics of depression, clinical experience suggests that successful suppression of increased sexual desire may produce the same result.

The functional shift is not an all-or-none phenomenon. The whole group of changes may be seen in severe cases, but in the majority of patients only a few changes occur. In many of the so-called atypical depressions there may be

a few negative functional shift symptoms, while others are in a positive direction, e.g. increased appetite, weight and libido, or difficulty in getting off to sleep rather than early waking. It is postulated that in such cases the individuals are less predisposed, being younger, less obsessional and more hysterical. Consequently, they are unable to suppress hypothalamic function in the same way as those fully predisposed. In many of these cases physical factors appear to be important precipitants. Examples are: puerperal depression, severe premenstrual depression, depression following major surgery and particularly oophorectomy (Roberts, 1959), hypothalamic lesions accompanied by depression (Alpers, 1940), depression following virus infections, notably influenza, and the syndrome developing after prolonged heavy administration of reserpine and phenothiazine derivatives. In a number of these examples endocrine disturbances probably influence the hypothalamus in that it is sensitive to specific changes wrought by hormones which are directly under its control (Gellhorn, 1957). Evidence for hypothalamic involvement in virus infection is not clear. The psychological symptoms and functional shift of depression induced by reserpine and chlorpromazine resemble closely classical depression; not infrequently they persist for some time after the drug has been withdrawn. The clinical effects of these drugs on appetite, weight, blood pressure and sleep have been attributed to their influence on hypothalamic function. It is likely that such direct influences on the hypothalamus in concert with the factors of age, personality, culture and upbringing lead to the appearance of a functional shift in the absence of marked psychological stress.

Many manic-depressive disorders, beginning in early adult life and showing a phasic course over the years, show a functional shift, and certain physiological aspects have been thoroughly investigated (Bellak, 1952). Their regularity often resembles the biennial swing from activity to hibernation seen in certain animals (Lange, 1928) and the greater proportion of depressive attacks which begin in spring (Mayer-Gross, Slater and Roth, 1955) may represent a phylogenetic hypothalamic

change rendering man more vulnerable at these times to severe disturbance in the form of the functional shift. No other part of the brain is responsible for controlling so many rhythmic activities and it may be plausible to add to its list of controls the determination of mood swings.

The functional shift, then, is the clinical result of the inactivation of primitive mechanisms serving to protect the healthy individual. This syndrome develops when the individual's threshold for hypothalamic suppression is reached under the combined influence of the many factors described. For example, a young hysterical subject should be unlikely to develop depression with a functional shift unless the hypothalamus is directly involved by endocrine changes or drugs. In older persons of

TABLE IV  
*Development of the Depressive Functional Shift*

PREDISPOSING FACTORS	
1. Heredity	
2. Influences serving to establish habitual inhibition of emotional expression:	
(a) Civilization	
(b) Mode of upbringing	
(c) Obsessive personality	
(d) Social position	
(e) Advanced age	
PRECIPITATING FACTORS	
Natural life situations	Physiological changes
Circumstances calling out emotion in settings requiring inhibition of its expression, e.g.:	The premenstrual phase
Grief	Pregnancy
Heightened sexual feelings	Puerperium
Anger	Menopause
	Oophorectomy
	Virus infections
	Reserpine and phenothiazines
	Debilitation
	Lesions of the hypothalamus
<i>Functional Shift and Depression characterized by:</i>	
Loss of biological defence mechanisms	
Lack of emotional expression	
Disturbance of metabolic regulators	
Secondary hypochondriasis	
Depressive stupor	
Death	

obsessional personality, life situations alone suffice to induce the functional shift, but if reserpine is given this development is likely to be both rapid and profound. It is postulated that the strength of these factors determines the degree of severity and rapidity of progress of the functional shift irrespective of the trigger. The greater incidence of depression in women, particularly of child bearing and menopausal age in Western cultures might be explained by this, in that they live longer and are subject to additional endocrine disturbances during menstruation, pregnancy, the puerperium and menopause. It also explains the inseparability of "reactive" and "endogenous" depressions on the basis of presence or absence of a significant stress in the environment. In the present hypothesis a depressive heredity is regarded as a predisposing factor which lowers the threshold for hypothalamic inhibition, rendering the individual more vulnerable to the effects of frustration and pathophysiological changes.

Table IV summarizes the relationships and extent of predisposing and precipitating factors. The period of time for which the individual is

exposed to some of these influences is important, the risk rising with increased exposure.

#### CLASSIFICATION OF DEPRESSION

If this concept of physiological change is accepted, depressive illness can be divided into two main types, those with features of the depressive shift and those without. This division is necessary because treatment of the two types differs widely.

Depressions characterized by symptoms of the functional shift can be termed "physiological" depressions or "Type S" because they feature somatic changes of a semi-permanent kind. Several symptoms of the syndrome are sufficient to make the distinction. Reactions which do not include physiological changes will have been precipitated by purely psychological stress and will be understandable in terms of the predicament in which the patient finds himself. Most of the clinical picture will be of mental symptoms, although the autonomic nervous system may be involved in weeping and restlessness. For these reasons this variety of depression

TABLE V  
*Classification of Depression*

							Occurrence	
							Psychological Type J	Physiological Type S
Feature								
Aetiological:								
Environmental stress	..	..	..	..	..	Always	Often	
Physical stress	..	..	..	..	..	Occasionally	Often	
Personality:								
General inadequacies	..	..	..	..	..	Common	Occasional	
Psychological Changes:								
Feelings of depression	..	..	..	..	..	Always	Common	
Retardation	..	..	..	..	..	Absent	Common	
Delusions	..	..	..	..	..	Absent	Common	
Physiological Changes:								
Autonomic	..	..	..	..	..	In crisis only	Common	
Endocrine	..	..	..	..	..	Absent	Common	
Hypothalamic:								
*Early waking	..	..	..	..	..	Absent	Common	
*Appetite loss	..	..	..	..	..	Absent	Common	
*Weight loss	..	..	..	..	..	Absent	Common	
*Diminished libido	..	..	..	..	..	Absent	Common	
*Diurnal mood swing	..	..	..	..	..	Absent	Common	

\* Denotes that the symptom or group of changes is necessary for diagnosis of physiological depression.



could be called "psychological" or "Type J", to denote that it seems justified. This diagnosis should be made only after excluding all the features of the depressive functional shift. At this stage a scheme may be helpful to compare the major types suggested.

It can be seen that the only true differentiation is by the symptoms of the functional shift.

Subsequent classification of Type S depression based on information relevant to treatment and prognosis is suggested as follows:

TABLE VI

Physiological Depression	
Solitary Attack	Recurrent Attack
Puerperal	Simple recurrent depression
Menopausal	Manic-depressive type
Senile	Linked depressions
Common descriptive terms applying to both solitary and recurrent varieties:	
Retarded (classical depression)	
Agitated	
Atypical	
Paranoid	
Schizo-affective	
Mixed	

This classification has been put forward in an attempt to emphasize those factors which appear to explain and therefore govern both physical and psychodynamic treatment of depression at the present time, and to take account of certain facts which do not figure in schemes in current use. It is hoped that the present framework will facilitate the understanding of at least part of the accumulated knowledge in depression which cannot be seen in perspective in terms of existing theory.

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(Received 1 June, 1964)

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The British Journal of Psychiatry

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*BJP* 1965, 111:489-495.

Access the most recent version at DOI: [10.1192/bjp.111.475.489](https://doi.org/10.1192/bjp.111.475.489)

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